



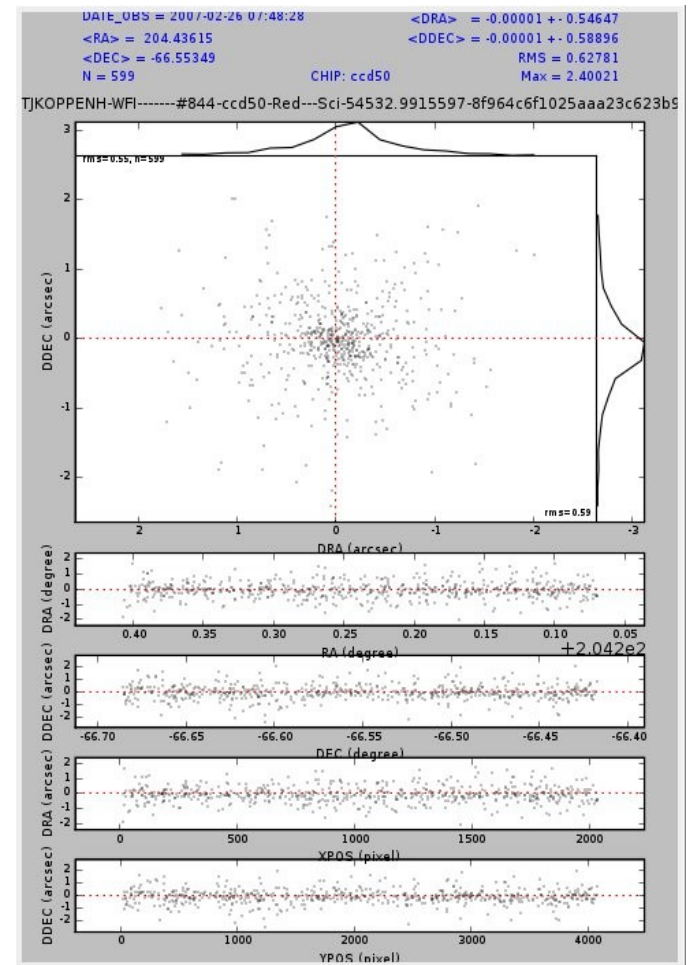
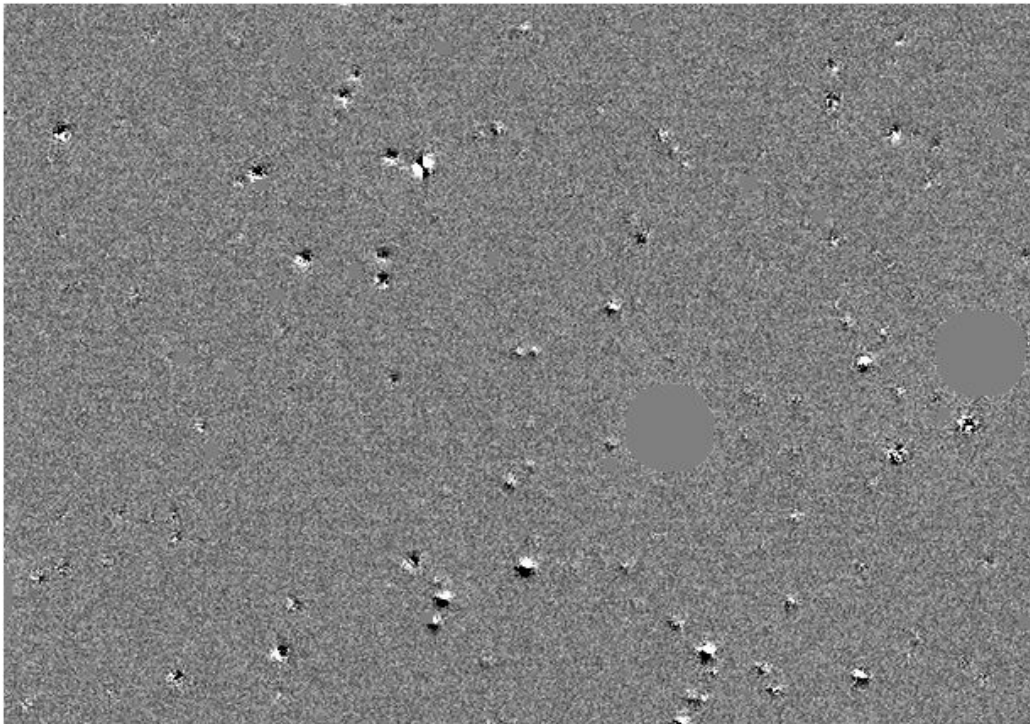
Relative Astrometry

AstroWISE workshop, Leiden 31.03.2008

why?

- USNO-A2 catalog has intrinsic scatter of $\sim 0.3''$
- precision needed by image subtraction: ~ 0.1 FWHM $\Rightarrow \sim 0.05-0.15''$

rms = 0.63''



what?

- image-to-image astrometry
- create SourceLists on reference image and
- replace USNO-A2 catalog by a higher precision catalog created on a reference image (e.g. Regridded or Coadded)
- use LDAC tool to create astrometric solution
- no/little proper motion effects
- more stable for higher order polynomials
- only applicable in overlapping regions

how (developers)?

```
awe> sl = SourceList()
awe> sl.frame = my_regridded_reference
awe> sl.make()
awe> from astro.config.Environment import Env
awe> import os, commands
awe> pwd_str = commands.getstatusoutput( 'pwd' )[1]
awe> refcat_str = pwd_str + '/' + sl.catalog
awe> Env.update( { 'astrometric_refcat' : refcat_str } )
```

```
awe> ast = AstrometricParameters()
awe> ast.reduced = my_reduced_input
awe> ast.make()
awe> ast.inspect()
awe> ast.commit()
```

add to preastrom.conf:

```
REF_RA = RA
REF_DEC = DEC
REF_MAG = MAG_APER
REF_CDELTA1 = CD1_1
REF_CDELTA2 = CD2_2
REF_XWID = MAPNAXS1
REF_YWID = MAPNAXS2
```

how-to do this (users)?

```
awe> reduced_filenames = [my_reduced1.filename, my_reduced2.filename,...]
awe> regridded_filename = my_regridded.filename
awe> my_pars = {'relative_reg' : regridded_filename}
awe> task = AstrometricParametersTask( instrument = 'WFI',
...   red_filenames = reduced_filenames, pars = my_pars, commit = 1 )
...
awe> task.execute()
```

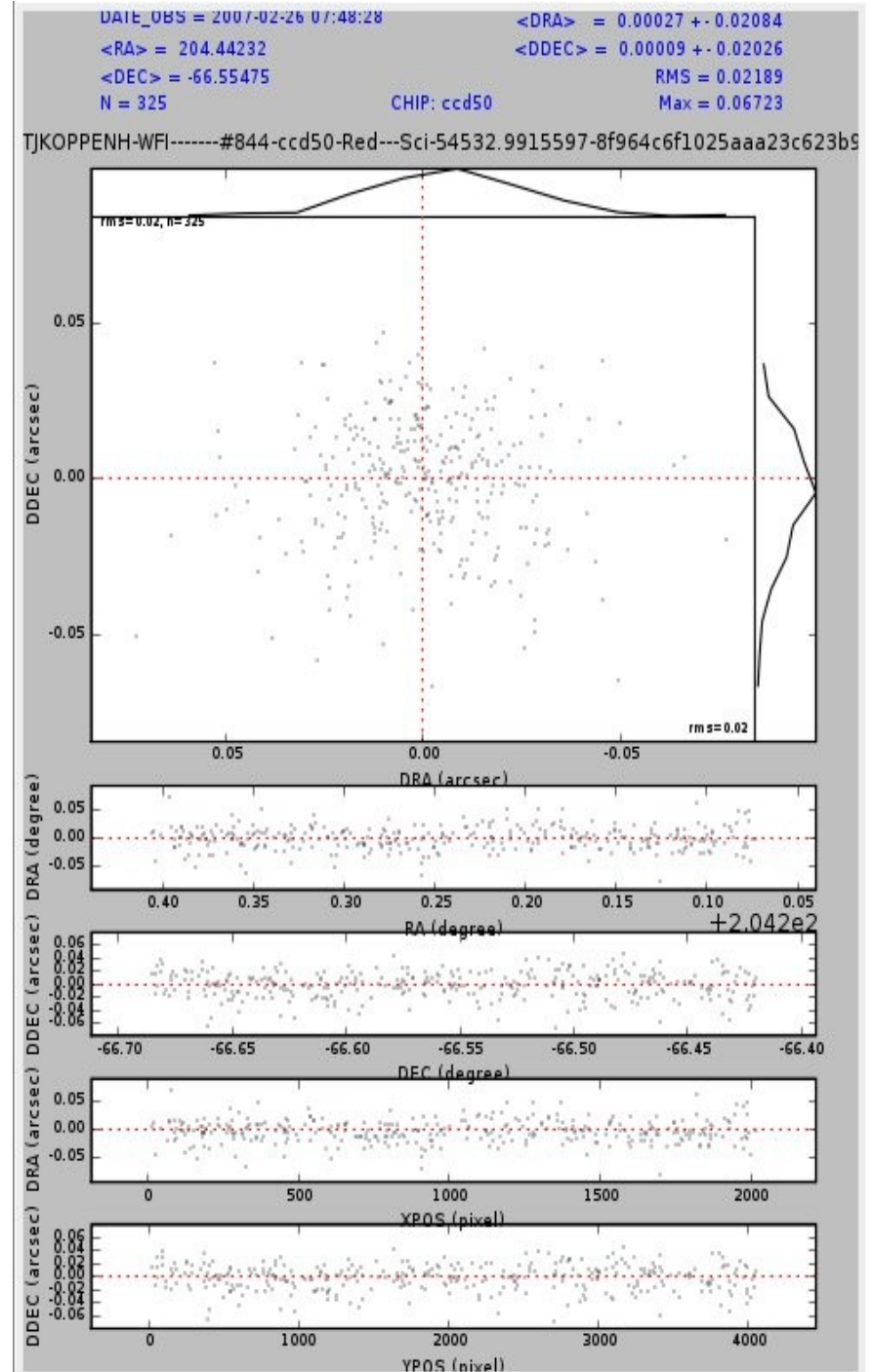
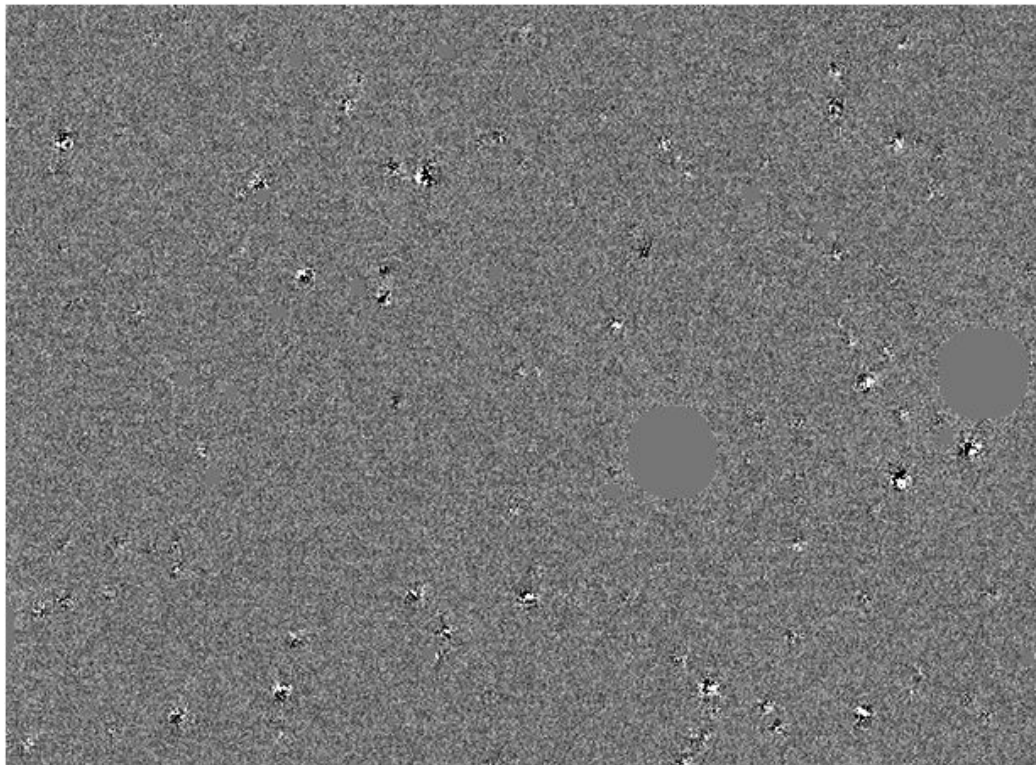
```
awe> reduced_filenames = [my_reduced1.filename, my_reduced2.filename,...]
awe> coadded_filename = my_coadded.filename
awe> my_pars = {'relative_coa' : coadded_filename }
awe> my_pars.update( {'order' : 3 } ) # changes PDEG
awe> dpu.run( 'Astrometry', i = 'WFI', d = '2004-10-03',
...   red_filenames = reduced_filenames, p = my_pars, C = 1 )
```

relative astrometry: parameters

```
awe> my_pars = {}  
awe> my_pars.update( { 'relative_reg' : regridded_filename } )  
awe> my_pars.update( { 'relative_coa' : coadded_filename } )  
awe> my_pars.update( { 'relative_ref' : reference_filename } )  
awe> my_pars.update( { 'order' : 3 } )  
awe> my_pars.update( { 'ref_stars' : 350 } )  
awe> my_pars.update( { 'stars' : 150 } )  
awe> my_pars.update( { 'ref_thresh' : 10 } )  
awe> my_pars.update( { 'thresh' : 3 } )  
awe> my_pars.update( { 'limit' : 0.1 } )
```


results:

rms: 0.022 arcsec



results:

rms: 0.628 arcsec

